rebroadcasts. Also during the harvest ceremonies, a photographer and representative from National Geographic Magazine was present to record information, gather data, and take photographs for inclusion in a future publication by National Geographic.

34.2.2 Fact Sheets

During the course of the project a fact sheet was developed to explain the use of geothermal fluids for the Navarro College project. This fact sheet was distributed at speaking engagements and during the dedication and harvest ceremonies.

34.2.3 Site Sign

A four-by-eight foot sign was designed by the project director, Dr. Lary Reed, to be used during the operational phase of the project. The sign was painted by a local firm and erected by college personnel at the site on October 25, 1983. A listing of the project purpose, scope, participants, and sponsors is identified on this sign.

34.2.4 Information Dissemination

A majority of inquiries to the college requested information in the form of publications or plans to use geothermal fluids for aquaculture or space heating application. All potential developers were informed that the final report on the project at Navarro College would be available from the U.S. DOE Information Center after September 1984. These people were also sent copies of the project fact sheet and publications on previous research from the Geo-Heat Center at Oregon Institute of Technology. Approximately 100 packets of information were distributed in this manner.

34.2.5 Tours

All interested developers have been encouraged to visit the campus and receive a tour of the geothermal facilities. To date over 1000 individuals have taken this tour and have come from as far away as California and New York to see this system in operation. As a result of one tour, given to personnel from Texas A & M University, the college participated in the 1984 Annual Fish Farmers of Texas Convention which was held to discuss current research in fish farming and aguaculture.

34.2.6 Automated Slide Show

An automated audio/visual slide show was identified as a particularly effective means to inform the public about the Navarro College project, and about the feasibility of using geothermal energy in Central Texas. The slide show has fulfilled two needs:

1) To serve as an automated audio/visual presentation for visitors; and

2) To accompany lectures and presentations by college personnel, DOE staff, and others.

The slide show program was produced by the Navarro College Telecommunications Department and is composed of 66 slides which were selected from over 500 slides taken during the course of the project. This presentation is approximately 10 minutes in length.

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APPENDIX A

PERMITS

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* Reconstructed by
Navarro College

TEXAS WATER DEVELOPMENT
STATE OF TEXAS
P.O. Box 13087 Capitol Station
Austin, Texas 78711
Area Code 512/475-3187

December 29, 1978

Navarro College Energy Development
P.O. Box 1170
Corsicana, Texas 75110

SC-693

Gentlemen:

RE: Navarro College, Well #1
A. Hicks Survey, A-335
Navarro County, Texas

Reference is made to your inquiry of December 21, 1978 regarding the protection of usable-quality water strata in your above named well.

Water-bearing strata must be protected down to a depth of 100 feet.

Please send an electrical log of this when it is available.

NOTE: The depth to which we recommend that useable-quality water strata should be protected is intended to apply only to the subject well. Approval of the well-completion methods for protection of this ground water falls under the jurisdiction of the Railroad Commission of Texas. This recommendation is intended for normal drilling and production operations only and does not apply to salt water disposal operations. It should not be used as a recommendation for fieldwide useable-quality water protection rules.

Very truly yours,

J.N. Russell,
Geologist
Surface Casing Section

cc: RRC, Austin
RRC, District Office #5

* Form Reconstructed by
Navarro College

RAILROAD COMMISSION OF TEXAS
OIL & GAS DIVISION
PERMIT TO DRILL, DEEPEN OR PLUG BACK
ON REGULAR LOCATION

PERMIT NUMBER	DATE OF PERMIT	DISTRICT
028397	7/13/78	05
NUMBER (API)	FORM W-1 (dated)	COUNTY
42 349 30775	7/07/78	Navarro
TYPE OF OPERATION		ACRES
Drill		127

OPERATOR 601085

Navarro College Energy Dev.
Highway 31 West
P.O. Box 1170
Corsicana, Texas 75110

NOTICE
NO ALLOWABLE WILL BE ASSIGNED unless well protects all fresh water sands with sufficient surface casing. Where Commission rules do not specify surface casing requirements, contact the Texas Department of Water Resources for depth to which fresh water sands must be protected.
PERMIT SUBJECT TO CONDITIONS ON BACK OF FORM
District Office Telephone No.:
AC 214 984-3026

LEASE NUMBER	WELL NUMBER
Navarro College	1
LOCATION	TOTAL DEPTH
2 Miles W From Corsicana	3,000
SECTION, BLOCK and/or SURVEY	
A. Hicks Sur., A-335	

DISTANCE--LEASE LINES	--SURVEY LINES	--NEAREST WELL ON LEASE
75 FWL & 887 FEL	600 FEL & 1430 FSL	None

FIELD (S)
WILDCAT

LIMITATIONS

WILDCAT ABOVE 3000. REGULAR FOR GEO-THERMAL AND OIL.

Based upon the representations made on the above FORM W-1 and those made on any plat or plats filed therewith, it is believed that the operation indicated, when carried out at that point which you have represented to be the location of the above designated Well complies as of the date thereof, with the provisions of the applicable spacing rule SUBJECT TO THE LIMITATIONS, IF ANY, SET OUT ABOVE. Compliance with the applicable Commission spacing rule renders it unnecessary that you secure a special Commission permit to cover this indicated operation at the location shown, the same being classed as regular.

If there are outstanding permits covering operations which have not actually been started as of the date of filing FORM W-1 above described and which, if started, would impair the regularity of this operation, then the permit covering that location on which the actual operation is the first begun shall prevail, and all other such outstanding permits shall be nullified.

THE UNIVERSITY OF TEXAS AT AUSTIN
Texas Archeological Research Laboratory
BALCONES RESEARCH CENTER
10,100 BURNET ROAD, AUSTIN, TEXAS 78758

March 9, 1979

Ms. K. T. Sherrill
Staff Economist
Radian Corporation
P. O. Box 9948
Austin, Texas 78766

Dear Ms. Sherrill:

I have checked our files and find that we have no presently recorded archeological sites on the grounds or in the vicinity of either Navarro College or Navarro County Memorial Hospital in Corsicana. This does not negate the possibility of sites, but merely indicates none have been officially reported to us.

We hope this information will be of value in your environmental assessment. If we can be of further assistance, please let us know.

Sincerely yours,

Carolyn Spock

Carolyn Spock
Research Associate

Invoice enclosed

United States Department of Agriculture
Soil Conservation Service
P. O. Box 648
Temple, TX
76501

March 29, 1979

Ms. Ann E. St. Clair
Staff Geologist
Radian Corporation
8500 Shoal Creek Blvd.
Austin, TX 78766

Dear Ms. St. Clair:

We have reviewed your notice of intent to prepare an environmental assessment on the drilling of a geothermal well at Navarro County Memorial Hospital and find that this proposed project will not involve any prime farmland.

The soils involved in this project are Crockett fine sandy loams, 1 to 3 percent slopes, which are not classified as prime farmland.

Sincerely,

For C. Budd Faulkner

George C. Marks
State Conservationist

Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, NV 89114

JUN 12 1979

Mr. C. Paul Green, Project Manager
Navarro College
Box 1170
Corsicana, TX 75110

Dear Mr. Green:

COOPERATIVE AGREEMENT DE-FC08-79ET 27058 - NAVARRO COLLEGE, CORSICANA, TEXAS

Please reference Cooperative Agreement Article I., D., Compliance with the National Environmental Policy Act, and the Environmental Report dated May 1, 1979, prepared by the Radian Corporation, Austin, Texas.

The DOE/Nevada Operations Office has assessed the environmental impact of the work tasks for this project, and the findings conclude that this project does not constitute a major Federal action having significant impact upon the quality of the human environment. An environmental assessment is not warranted.

Therefore, you are requested and authorized to proceed with the tasks defined in Appendix A, including the drilling of the reinjection well into the known geothermal resource area, and perform logging and production testing for a final reservoir confirmation, all according to the requirement of the Cooperative Agreement.

Sincerely,

Robert W. Taft, Assistant Manager
for Plans, Engineering & Budgets

E&EAD:RLM-1256

cc: M. Conover, Radian Corp.,
Austin, TX
B. Allen, CC
D. Morse, C&P
D. Parker, FIN

* Form Reconstructed by
Navarro College

RAILROAD COMMISSION OF TEXAS
OIL & GAS DIVISION
PERMIT TO DRILL, DEEPEN OR PLUG BACK
ON REGULAR LOCATION

PERMIT NUMBER	DATE OF PERMIT	DISTRICT
057126	9/04/79	05
API NUMBER	FORM W-1 (dated)	COUNTY
42 349 30937	8/21/79	Navarro
TYPE OF OPERATION		ACRES
Drill		127

OPERATOR 601085

Navarro College Energy Dev.
Highway 31 West
P.O. Box 1170
Corsicana, Texas 75110

NOTICE

NO ALLOWABLE WILLBE ASSIGNED unless well protects all fresh water sands with sufficient surface casing. Where Commission rules do not specify surface casing requirements, contact the Texas Department of Water Resources for depth to which fresh water sands must be protected.
PERMIT SUBJECT TO CONDITIONS ON BACK OF FORM

District Office Telephone No.:
AC 214 984-3026

LEASE NUMBER	WELL NUMBER
Navarro College	2
LOCATION	TOTAL DEPTH
2 Miles W From Corsicana	5,000
SECTION, BLOCK and/or SURVEY	
A. Hicks Sur., A-335	

DISTANCE--LEASE LINES	--SURVEY LINES--	--NEAREST WELL ON LEASE
800 FNL & 1470 FEL	2000 FNL & 880 FEL	900 E

FIELD (S)

WILDCAT

LIMITATIONS

WILDCAT ABOVE 5000. REGULAR PROVIDED THIS WELL NEVER COMPLETED IN THE SAME RESERVOIR AS ANY OTHER WELL CLOSER THAN 1200 FEET ON THIS SAME LEASE.

Based upon the representations made on the above FORM W-1 and those on any plat or plats filed therewith, it is believed that the operation indicated, when carried out at that point which you have represented to be the location of the above designated Well complies as of the date thereof, with the provisions of the applicable spacing rule SUBJECT TO THE LIMITATIONS, IF ANY, SET OUT ABOVE. Compliance with the applicable Commission spacing rule renders it unnecessary that you secure a special Commission permit to cover this indicated operation at the location shown, the same as being classed as regular.

If there are outstanding permits covering operations which have not actually been started as of the date of filing FORM W-1 above described and which, if started, would impair the regularity of this operation, then the permit covering that location on which the actual operation is the first begun shall prevail, and all other such outstanding permits shall be nullified.

URN TO:
ailroad Commission of Texas
il and Gas Division
duction and Proration Section
itol Station - P. O. Drawer 12967
Texas 78711

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

ORGANIZATION REPORT
TYPE OR PRINT--INSTRUCTIONS ON REVERSE SIDE

Form P-5
REV 1/81

is the initial and principal instrument that identifies an organization to the Commission. It is operative that it be fully and correctly executed and filed before an organization initiates operations.

2. RRC Operator No. (if assigned)
NEW VENTURE

3. Purpose of Filing
- [X] New Filing
- [ ] Address Correction
- [ ] Change of Officers
- [ ] Annual Refiling

Organization Name and Mailing Address

Navarro College Energy Dev.
Highway 31 West
P.O. Box 1170
Corsicana, Texas 75110

If mailing address has changed, indicate new address here.

N/A

4. Street Address if different from above mailing address.

Street	City	State	Zip Code
N/A			
If street address has changed, indicate new address here. N/A			

5. Current Plan of Organization:
If this application is new or organization has changed, select one.

- [ ] A. Corporation
- [ ] B. Limited Partnership
- [ ] C. Sole Proprietorship
- [ ] D. Partnership
- [ ] E. Trust
- [ ] F. Joint Venture
- [X] G. Other PUBLIC JR. COLLEGE

6. Principal Officers, Partners, Joint Venturers, and Trustees (required on all organizations)

Name Dr. Kenneth P. Walker
Title President
Address P.O. Box 1170
Corsicana, Texas 75110

[redacted]: Name James R. Ruth
Title Plant Specialist
Address P.O. Box 1170
Corsicana, Texas 75110

Name Darrell R. Raines
Title Fiscal Officer
Address P.O. Box 1170
Corsicana, Texas 75110

[redacted]: Name N. H. Hardgrave
Title Agent
Address P.O. Box 92
Corsicana, Texas 75110

Name C. Paul Green
Title Director of Development
Address P.O. Box 1170
Corsicana, Texas 75110

[redacted]: Name
Title
Address

7. If a reorganization, give name and address of previous organization.

N/A

8. If Item No. 1 listed above is a subsidiary or an assumed name (dba), give name and address of associated company.

N/A

FOR RRC USE ONLY

Approved by:

Date:

Remarks:

135

*Reconstructed by Navarro College

Signature Darrell R. Raines
Name Darrell R. Raines
Title Fiscal Officer
Date 2/05/80 Telephone 214 (Area Code) 874-6501 (Number)

CERTIFICATE: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

1124 S. IH 35 — CAPITOL STATION — P. O. DRAWER 12967 — AUSTIN, TEXAS 78

October 13, 1981

Navarro College Energy Development
P.O. Box 1170
Corsicana, Texas 75110
ATTENTION: Dr. Larry L. Reed

Re: Permit to Inject Fluid Into a
Reservoir Productive of Geothermal Resou
Wildcat Field,
Navarro County, Texas.

Gentlemen:

This will acknowledge receipt of Commission Form GT-5 and supporting evidence submitted in connection with your "Application to inject into a Geothermal Reservoir on the subject lease in compliance with Commission Statewide Rule 46.

The Commission hereby grants you permission to use only the following well to inject Geothermal Water into the Woodbine Formation at an average depth of 2234 feet underlying the subject lease;

Navarro College (02112) Lease, Well No. 2

Fluid Injection must be through tubing set on a mechanical packer, and the injection pressure may not exceed 550 psi. The Commission's district director must be notified prior to any workover or remedial operation, including running tubing and setting a packer.

A new Form W-2 must be filed to show the current completion status of the injection well. The injection permit date should be indicated on the new Form W-2. Also, the date that injection operations commenced (or the anticipated date that such operations will commence) should be included in the Remarks Section of Form W-2.

Provided further that, should it be determined by the Commission that such injected fluid is not confined to the approved strata, then the permission given herein shall be suspended and the fluid injection stopped until the fluid migration from such strata is eliminated.

Sincerely yours,

Jerry W. Mullican
Director of Underground
Injection Control

cc: RRC, Kilgore
Proration - 05
Radian Corp.

NAVARRO COLLEGE
POST OFFICE BOX 1170 • CORSICANA, TEXAS 75110 • 214/874-6501

May 19, 1982

Ms. Jane Watson
Environmental Protection Agency
1201 Elm St.
First International Bldg.
Dallas, Texas 75270

Dear Ms. Watson:

Thank you for the information you provided in our telephone conversation on May 19, 1982. As you are aware, we at Navarro College will be involved in an aquaculture project which will consist of less than one acre of research ponds with the effluent being collected in an irrigation reservoir. The total annual yield from these ponds will be considerably less than the guideline limit of 20,000 pounds. The majority of the effluents will be used for irrigation purposes with only limited discharge being eliminated by way of a natural drainage system during periods of excessive run off.

It is our understanding that the project as designed will meet Environmental Protection Agency rules and regulations; therefore, we request a letter from you confirming that Environmental Protection Agency permits are not required for our proposed aquaculture research project. Based on our telephone conversation, it is my understanding that this confirmation creates no problem for you; however, if additional information is needed and if forms need to be completed, please inform us.

Thank you once again for your help; if you are in the Corsicana area during the near future, I invite you to the campus for a visit.

Sincerely,

Lary L. Reed, Ed. D
Executive Dean

Kenan C. Smith
Aquaculture Research Consultant

LLR:mw
KCS:ss

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APPENDIX B

WATER QUALITY TESTS

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TABLE 2-6. CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN WATER FROM THE WOODBINE FORMATION NEAR CORSICANA (all units except pH are mg/ℓ)

	Woodbine[1] at Corsicana	Woodbine[2] East of Corsicana	Woodbine[2] Navarro College Test Well
Ca	13	96	13
Mg	5.4	420	5.6
Na	1,810 (Na + K)	6,100	2,020
HCO_3	1,580	1,250	1,140
SO_4	153	<5	38
Cl	1,790	8,700	2,560
F	2.5	1.05	--
TDS	4,550	15,000	5,300
Hardness, $CaCO_3$	55	--	--
pH	--	8.0	--

[1]From Thompson, Gerald L., Ground-Water Resources of Navarro County, Texas. Report 160, Texas Water Development Board. November 1972.

[2]Analyses performed by Radian Corporation.

TABLE 2-7. CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN WATER FROM THE NACATOCH SAND AND NAVARRO GROUP NEAR CORSICANA (all units except pH are mg/ℓ).

	Nacatoch 33-61-401	Nacatoch 33-61-402	Navarro 33-61-701
Depth, meters (ft.)	39 (127)	55 (181)	15 (48)
SiO_2	28	22	27
Ca	11	7	99
Mg	4	1	11
Na	290	317	146
K	2.1	12.0	31.0
HCO_3	448	428	426
SO_4	129	118	187
Cl	132	150	53
F	0.7	0.8	0.7
TDS	817	838	765
Hardness as $CaCO_3$	43	24	292
pH	7.4	8.5	7.2

Source: Thompson, Gerald L., Ground Water Resources of Navarro County, Texas. Report 160, Texas Water Development Board. November 1972.

ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Dallas, Texas 10-22-82 File No. New

Report of: Analysis of Water

Reported to: Navarro College, Attn: Dr. Larry Reed
P.O. Box 1170
Corsicana, TX 75110

Date received: 8-30-82

Identification: Water from Geothermal Well #1

pH 8.8 (**7.0) Specific Gravity
Conductivity, micromhos/cm 11400 Resistivity @ °F

	Mg/l	
Silica	23.2	
Iron	*0.05	(0.3)
Aluminum	*0.10	
Manganese	*0.05	(0.5)
Calcium	28	
Magnesium	9	
Sodium	2500	
Potassium	9.56	
Carbonate, CO3	168	
Bicarbonate, HCO3	695	
Sulfate, SO4	6	(300)
Chloride, Cl	3530	(300)
Fluoride, F	2.5	(1.8)
Nitrate, NO3	0.95	
Phosphate, PO4	0.7	
Hydroxide, OH	0	
P-Alkalinity (as CaCO3)	140	
Total Alkalinity (as CaCO3)	850	
Total Hardness (as CaCO3)	110	
Total Dissolved Solids (by evaporation @ 180°C)	7110	(1000)
Total Suspended Solids	7	

*Less than **Greater than (...) Maximum Specifications on drinking water standards.

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Ronald G. Yarbrough

Ronald G. Yarbrough

Distribution of report:

3c-Navarro College

3c-Navarro College, 10-25-82
Corrected copy

Lab. No. D-18078 /bc 143

	mg/l	
Uranium, U	0.005	
Arsenic, As	*0.01	(0.05)
Barium, Ba	0.89	(1)
Cadmium, Cd	*0.01	(0.01)
Chromium, Cr	*0.05	(0.05)
Lead, Pb	*0.05	(0.05)
Mercury, Hg	*0.002	(0.002)
Selenium, Se	*0.01	(0.01)
Silver, Ag	*0.01	(0.05)
Zinc, Zn	*0.01	(5.0)
Boron, B	17.3	

	pci/L	
Radium - 226	2.18 ± 0.46	(5)
Gross Alpha	24 ± 60	(15)
Gross Beta	15 ± 50	

APPENDIX C

WELL LOGS

P. O. Box [illegible] — TEXAS — Dallas, Texas 75[illegible]

Well Logging Service

Electric Log

COMPANY NAVARRO COLLEGE ENERGY DEVELOPMENT

WELL WELL NO. - 1. (THERMAL SUPPLY)

FIELD WATER WELL

COUNTY NAVARRO STATE TEXAS

Location: ON WEST EDGE OF NAVARRO COLLEGE CAMPUS

Sec. ____ Twp. ____ Rge. ____

Type Log: E.S.

Permanent Datum G.L. Elev. ____

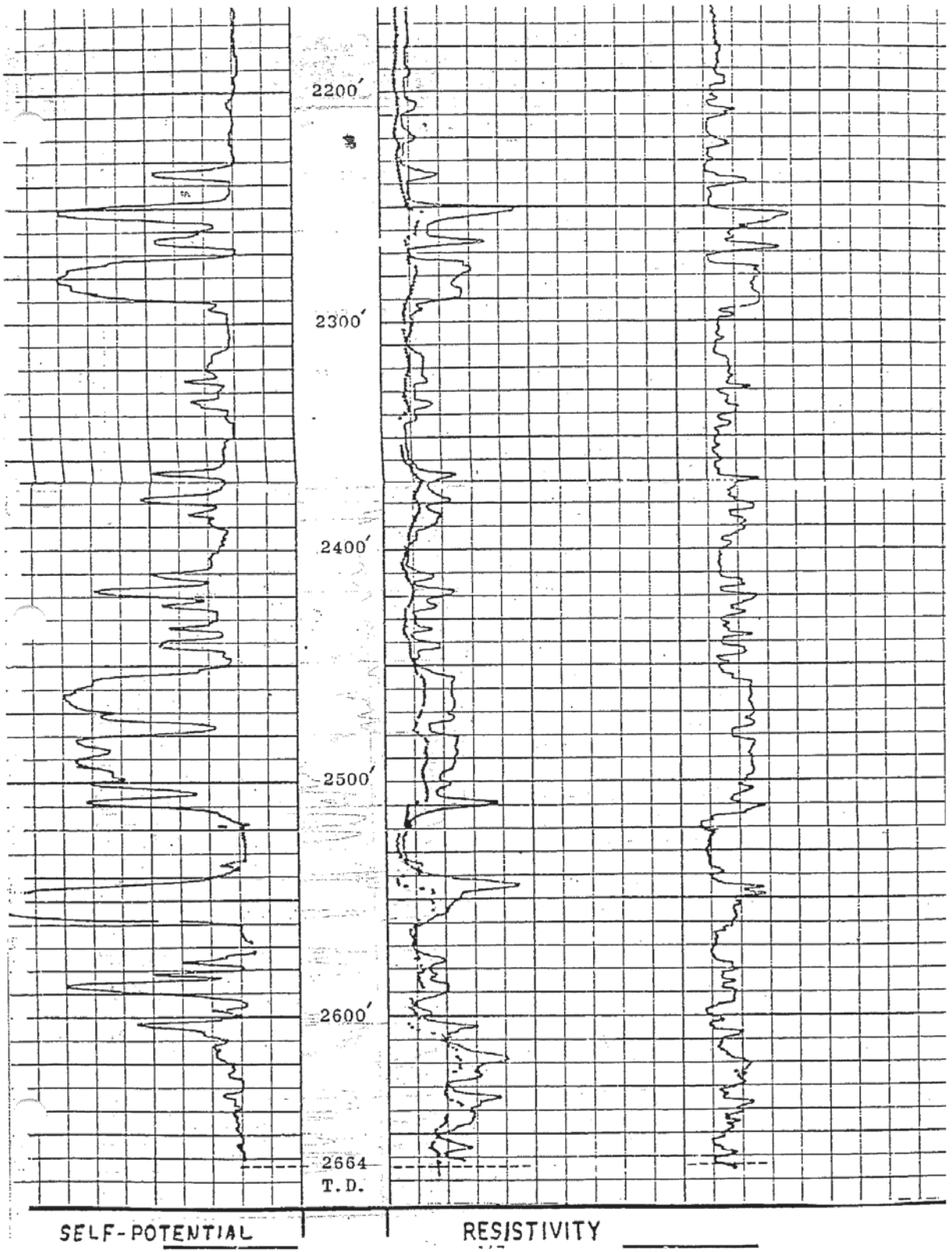
Log Measured From G.L. ____ Ft. Above Perm. Datum

Drilling Measured From G.L.

Elev.: K.B. ____ D.F. ____ G.L. ____

Date	09-21-78	09-28-78		
Run No.	ONE	TWO		
Depth - Driller	2523'	2665'		
Depth - Logger	2523'	2664'		
Btm. Log Inter.	2520'	2664'		
Top Log Inter.	238'	2200'		
Casing - Driller	@	@	@	@
Casing - Logger	10-3/4" @ 238'			
Bit Size	9-5/8"			
Type Fluid in Hole	CHEMICAL			
Dens. / Visc.				
pH / Fluid Loss	ml	ml	ml	
Source of Sample				
Rm. @ Meas Temp.	@ °F	@ °F	@ °F	@
Rmf. @ Meas Temp	@ °F	@ °F	@ °F	@
Rmc. @ Meas. Temp.	@ °F	@ °F	@ °F	@
Source: Rmf. Rmc				
Rm. @ BHT	@ °F	@ °F	@ °F	@
Time Since Circ.				
Max. Rec. Temp.	°F	°F	°F	
Equip. / Location				
Recorded By	T. C. LARGENT			
Witnessed By	H. N. HARDGRAVE			

REMARKS


2200'
2300'
2400'
2500'
2600'
2664
T.D.
SELF-POTENTIAL
RESISTIVITY

COMPANY: NAVARRO CO. JR. COLLEGE
WELL: GEOTHERMAL #2
FIELD:
COUNTY: NAVARRO STATE: TEXAS
NATION: U. S.
LATITUDE: LONGITUDE:
LOCATION: NAVARRO JR. COLLEGE

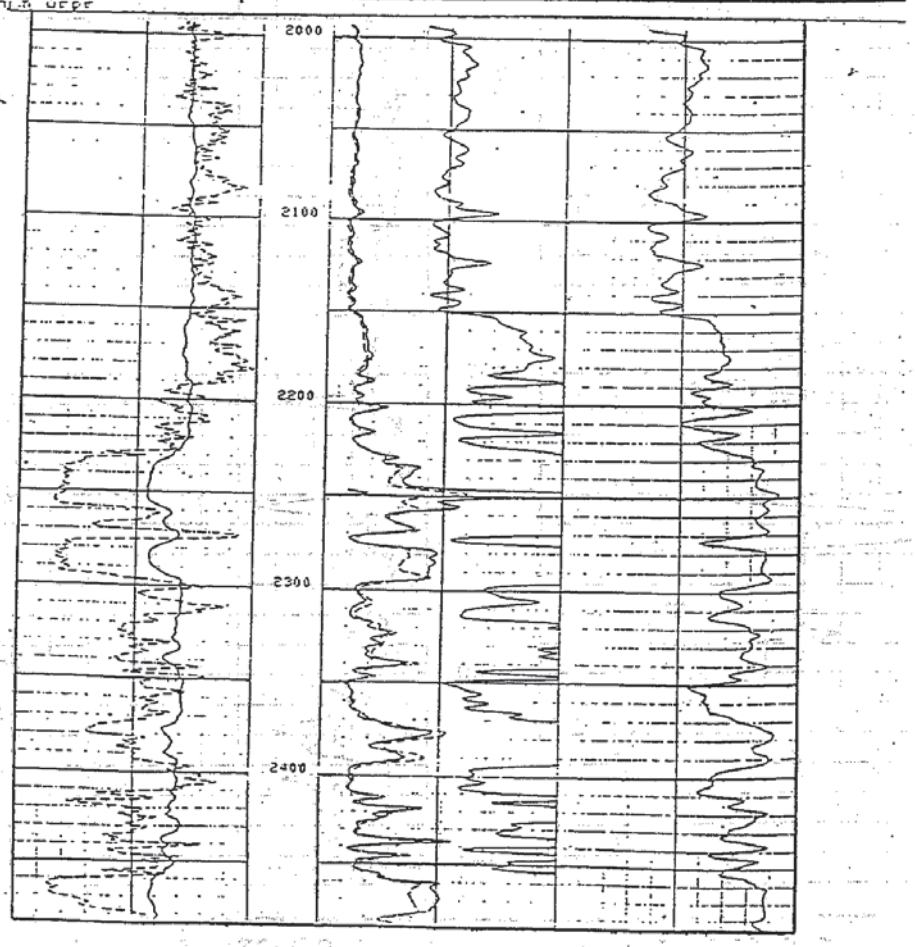
SEC: TWP: RGE:

PERMANENT DATUM: GL
ELEVATION OF PERMANENT DATUM: 467.5 FEET
LOG MEASURED FROM: KB
DRILLING MEASURED FROM: KB
ELEVATION-
K.B.: 480.5 FEET D.F.: 479.5 FEET G.L.: 467.5 FEET

OTHER SERVICES-
REPEAT FORMATION TESTER

Date 12/21/79

FOLD HERE



APPENDIX D

TESTING AND BALANCING OF SYSTEM

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Δt DELTA-T
AIR CONDITIONING SYSTEMS ANALYSIS — TESTING AND BALANCING

February 20, 1984

McKinney & Moore, Inc.
P.O. Box 787
Jacksonville, TX 75766

Attn: Mr. George McKinney

Re: Testing & Balancing
Aquaculture Facility With
Cascade Greenhouse
Navarro College
Corsicana, Texas

Gentlemen:

We have completed the testing and balancing on the above referenced project. Listed below are the results of our tests.

WATER FLOWS

The water flows were adjusted and read out with a differential flow meter supplied to the college by the mechanical contractor as per the mechanical specifications.

The GPM on the primary side of the plate heat exchanger was determined by reading the Venturi installed by the mechanical contractor. The GPM on the secondary side of the plate heat exchanger was determined by the water meter measuring city water.

The GPM being pumped to the effluent pond by pumps HWP-1 and HWP-2 was determined by using manufacturers curves and test gauge readings. We would like to point out that the pump is not a meter and the accuracy of the GPM is less than that of a meter.

The GPM can only be approximated by using the manufacturers test curves, test gauge readings and estimating the velocity pressure head. The velocity pressure head cannot be measured in the field.

11550 PLANO ROAD SUITE 306 DALLAS, TEXAS 75243 214—348-7430

TEMPERATURE READINGS

The temperature readings were taken with a Keithley 871 Digital Thermometer which was checked with a laboratory thermometer before the temperature tests were performed. The calibration points of the temperature recorders were also established by using a Keithley digital type thermometer.

CONTROLS

The controllers were checked by simulating temperature conditions by turning the installed thermostats. All controls function as they should as specified at the time of the test with the exception of the three way valve controlling the geothermal water, the valve control head was being repaired.

EXHAUST FANS

The exhaust fans were tested by using a Jaquet Tachometer and a Digital Ammeter manufactured by Amprobe. Static pressure and CFM could not be determined on these fans because they are a propeller type and do not have any duct work attached. The results of our readings are recorded on the exhaust fan data sheets.

HEATING AIR UNITS (CASCADE GREENHOUSE)

The CFM of FAHU-1 and FAHU-2 was determined by traversing the entering side of the heating coil with an Airflow Development Electronic Vane Anenometer. The results of all our tests are recorded on the air handling unit coil test data sheets.

PIPING CHANGES

The following piping changes have been made from the original contract drawings.

The boiler has been piped in series with the plate heat exchanger. This piping change was made during the extremely cold weather during December of 1983. For more explanation, see Boiler tab.

The pond effluent water has been piped to the mechanical equipment room. A new pump has been added and the piping changed to use the pond effluent water instead of city water. This change was made because of the operating cost of using city water. When observing the new piping from the effluent pond we discovered that the pressure relief valve on the boiler had been changed from 30 pounds to 45 pounds. The boiler maximum operating pressure is 30 pounds. The boiler does not meet code requirements and the pressure relief valve should be changed back to the original 30 pound valve. If the 30 pound boiler pressure relief valve relieves when the pond effluent water is being pumped to the aquaculture ponds the piping and valving arrangement should be changed so this condition cannot exist.

AMPERAGE (IMBALANCED)

When taking the amperage readings on the electric motors serving the fans and pumps we noticed an imbalance of amperage on each of the three phases. These readings are recorded on their respective data sheets. The electrician should check this problem.

SUGGESTIONS

1. We suggest that some type of water meter device be installed in each of the branch lines serving the two aquaculture ponds. This should be done so that the run off of each pond can be accurately set within a minimum amount of time. The only way to measure GPM entering the ponds at the present time is to measure the run off in each effluent sump. This method is time consuming.

2. There should be a Venturi installed on the common discharge for pumps HEWP-1 and HEWP-2 so that the GPM can accurately be measured.

3. There should be a thermometer well (pete's plug) installed in the new piping that goes from the plate heat exchanger to the boiler.

4. Also, pressure taps should be installed on the primary and secondary sides of the plate heat exchanger. These taps would be used to take pressure readings across the heat exchanger to determine if they are becoming dirty, corroded or plugged.

If there are any questions concerning this report, please contact me.

DELTA-T, INC.

JAMES M. NIX
President

JMN/ee

FANS

VF-1 THRU VF-10